UNITED STATES PATENT AND TRADEMARK OFFICE

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09/724,025	11/28/2000	David Herring	AUS920065002US1	6894

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ART UNIT	PAPER NUMBER
3628	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

	Application No.	Applicant(s)
Notice of Allowability	09/724,025	HERRING ET AL.
	Examiner	Art Unit	
	SHANNON S. SALIARD	3628	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *8/23/07*.

2. ☒ The allowed claim(s) is/are *1-4, 6-8, 10- 17, 19-29, 62, 63 and 65-69* .

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All   b) ☐ Some*   c) ☐ None of the:

        1. ☐ Certified copies of the priority documents have been received.

        2. ☐ Certified copies of the priority documents have been received in Application No. _____ .

        3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the

          International Bureau (PCT Rule 17.2(a)).

    * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.

    (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached

        1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____ .

    (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of

        Paper No./Mail Date _____ .

    Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)

2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)

3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____

4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material

5. ☐ Notice of Informal Patent Application

6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .

7. ☒ Examiner's Amendment/Comment

8. ☐ Examiner's Statement of Reasons for Allowance

9. ☐ Other _____ .

DETAILED ACTION

EXAMINER'S AMENDMENT

1.   An examiner's amendment to the record appears below. Should the changes

and/or additions be unacceptable to applicant, an amendment may be filed as provided

by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be

submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview

with Mr. Timothy Bechen on 19 November 2007.

The application has been amended as follows:

1. (Currently Amended) A method for analyzing a potential cause of a change in a

service, wherein service quality of the service is monitored, usage of the service is

measured, and service events are detected, the method comprising:

determining a service change time window based at least in part upon a change

in service quality between a first working state and a second, non-working state, and

upon a change in service usage amount, the service change time window

encompassing at least part of a service outage;

retrieving data representing a plurality of detected events and a-corresponding

times in which the events occurred;

computing a probability for each of the detected events that each of the detected

events caused the service change based at least in part on a correlation between the

event time and the service change time window;

determining whether one or more other events of a type identical to one of the

detected events occurred;

and wherein computing the probability comprises computing the probability using

at least in part a false occurrence weighting function which decreases the probability of

the detected event as the cause of the service change for instances in which the

detected event occurred outside the service change time window.

2. (Original) The method of claim 1, wherein determining the service change time

window comprises determining a service failure time window based upon the change in

service quality and narrowing the service failure time window to the service change time

window based upon the service usage amount measured during that service failure time

window.

3. (Original) The method of claim 2, wherein the service quality is monitored through

periodic polling of the service quality, and comprising determining the service failure

time window as bounded by a polled point of the first working state and a polled point of

the second, non-working state.

4. (Original) The method of claim 1, wherein computing the probability comprises

computing the probability using at least in part a time weighting function which decreases exponentially with the distance between the event time and the service change time window.

5. (Cancelled)

6. (Previously Amended) The method of claim 1, comprising storing historical data associating occurrences of prior events with prior service changes, and wherein computing the probability that one of the detected events caused the service change comprises computing the probability based at least in part on the historical data.

7. (Original) The method of claim 6, wherein storing historical data comprises storing data representing instances in which prior events occurred within prior service change time windows, and wherein computing the probability that the detected event caused the service change comprises using at least in part a positive occurrence weighting function which increases the probability of the detected event as the cause of the service change based on instances in the historical data in which a prior event of a type identical to the detected event occurred within a prior service change time window.

8. (Original) The method of claim 6, wherein storing historical data comprises storing data representing instances in which prior events were identified as having caused prior service changes, and wherein computing the probability that the detected event caused

the service change comprises using at least in part a historical weighting function which

increases the probability of the detected event as the cause of the service change

based on instances in the historical data in which a prior event of a type identical to the

detected event was identified as having caused a prior service change.

9. (Cancelled)

10. (Currently Amended) The method of claim 1, wherein computing probabilities

comprises computing the probabilities such that the total of all computed probabilities is

1.

11. (Currently Amended) The method of claim 1, wherein the service comprises service

over a communication network and wherein the detected events include a network

event.

12. (Currently Amended) The method of claim 1, wherein the service comprises service

provided by an application program and wherein the detected events include comprises

an application program event.

13. (Original) The method of claim 1, wherein the service change is a service outage,

comprising determining the service change time window as a change in service quality

from the first working state to the second, non-working state.

14 (Original) The method of claim 1, wherein the service change is a service recovery, comprising determining the service change time window as a change in service quality from the second, non-working state to the first, working state.

15 (Original) The method of claim 1, wherein determining the service change time window comprises detecting a change in service quality by detecting a step change in measured usage.

16 (Currently Amended) A method for analyzing potential causes of a service change, the method comprising: determining a service change time window encompassing a change of service between a first working state and a service outage, the service change being determined at least in part based on measured service usage levels; detecting occurrences of a set of events; retrieving data representing the plurality of detected events and corresponding times in which the events occurred, wherein the set of events are within a given time prior to and during the service change time window, each occurrence of an event being associated with a time at which the event occurred; computing a probability distribution for the set of events, which probability distribution determines for each event in the set the probability that the detected event caused the service change, the probability distribution being based at least in part on relations between the time of each event occurrence and the service change time window; and

wherein computing the probability includes using two or more second functions selected from the group consisting of: a time weighting function which decreases exponentially the probability of a given event as the cause of the service change with the distance between the given event time and the service change time window; a false occurrence weighting function which decreases the probability of a given event as the cause of the service change for instances in which events of the same type as the given event occurred outside the service change time window; a positive occurrence weighting function which increases the probability of a given event as the cause of the service change based on instances stored in a historical database in which events of the same type as the given event occurred within a prior service change time window; and a historical weighting function which increases the probability of a given event as the cause of the service change based on instances in the historical database in which events of the same type as the given event were identified as having caused a prior service outage.

17. (Original) The method of claim 16, wherein computing the probability distribution for the set of events comprises computing the probability distribution using a first weighting function which is the product of two or more second weighting functions.

18. (Cancelled)

19. (Original) The method of claim 16, wherein the step of computing the probability

distribution comprises using a first weighting function which is the product of the time

weighting function, false occurrence weighting function, positive occurrence weighting

function, and user weighting function.

20. (Original) The method of claim 16, comprising monitoring service quality, and

wherein determining the service change time window comprises determining a service

failure time window based upon a change in monitored service quality and narrowing

the service failure time window to the service change time window based upon the

service usage amount measured during that service failure time window.

21. (Original) The method of claim 20, wherein the service quality is monitored through

periodic polling of the service quality, and comprising determining the service failure

time window as bounded by a polled point of the first working state and a polled point of

the second, non-working state.

22. (Original) The method of claim 16, comprising computing the probability distribution

such that the total of all probabilities in the distribution is 1.

23. (Original) The method of claim 16, wherein the service comprises service over a communication network and wherein the detected events comprise network events.

24. (Original) The method of claim 16, wherein the service comprises service provided by an application program and wherein the detected events comprise application program events.

25. (Original) The method of claim 16, wherein the service change is a service outage, comprising determining the service change time window as a change in service from the first working state to the second, non-working state.

26. (Original) The method of claim 16, wherein the service change is a service recovery, comprising determining the service change time window as a change in service from the second, non-working state to the first, working state.

27. (Previously Presented) The method of claim 16, wherein determining the service change time window comprises detecting a step change in measured usage.

28. (Currently Amended) A network monitoring system comprising: a service monitor for monitoring quality of service on the network; a usage meter for measuring usage of the network; an event detector for detecting a plurality of network events and corresponding times at which the network events occur; and

a probable cause engine, coupled to receive data from the service monitor, usage

meter, and the event detector, the probable cause engine including a processing device

that, in response to executable instructions, is operative to: set setting a service change

time window based upon data received from the service monitor or usage meter, the

service change time window encompassing at least part of an occurrence of a service

outage in the network; determine determining which of the network events detected by

the event detector is the most likely cause of a service change including computing a

probability for each of the detected events that each of the detected events caused the

service change based at least in part on a correlation between the event time and

service change time window; determining whether one or more other events of a type

identical to one of the detected events occurred; and wherein computing the probability

comprises computing the probability using at least in part a false occurrence weighting

function which decreases the probability of the detected event as the cause of the

service change for instances in which the detected event occurred outside the service

change time window.

29. (Currently Amended) A computer readable medium storing program code for, when

executed, causing a computer to perform a method for analyzing a potential cause of a

an change in a service, wherein service quality of the service is monitored, usage

amount of the service is measured, and service events are detected, the method

comprising: determining a service change time window based at least in part upon a

change in service quality between a first working state and a second, non-working state,

and upon a change in service usage amount, the service change time window

encompassing at least part of a service outage; retrieving data representing a plurality

of detected events and a-corresponding times in which the events occurred; computing

a probability for each of the detected events that each of the detected events caused

the service change based at least in part on a correlation between the event time and

the service change time window; determining whether one or more other events of a

type identical to one of the detected events occurred; and wherein computing the

probability comprises computing the probability using at least in part a false occurrence

weighting function which decreases the probability of the detected event as the cause of

the service change for instances in which the detected event occurred outside the

service change time window.

30. - 61. (Cancelled)

62. (Currently amended) Computer readable media comprising program code that,

when executed by a programmable microprocessor, causes the programmable

microprocessor to execute a method for analyzing potential cause of a service change,

the method comprising: determining a service change time window encompassing a

change of service between a first working state and a service outage, the service

change being determined at least in part based on measured service usage levels;

detecting occurrences of a set of events; retrieving data representing the plurality of

detected events and corresponding times in which the events occurred, wherein the set

of events are within a given time prior to and during the service change time window, . each occurrence of an event being associated with a time at which the event occurred; computing a probability distribution for the set of events, which probability distribution determines for each event in the set the probability that the detected event caused the service change, the probability distribution being based at least in part on relations between the time of each event occurrence and the service change window; wherein computing the probability includes using two or more second functions selected from the group consisting of: a time weighting function which decreases the probability of a given event as the cause of the service change with the distance between the given event time and the service change time window; a false occurrence weighting function which decreases the probability of a given event as the cause of the service change for instances in which events of the same type as the given event occurred outside the service change time window; a positive occurrence weighting function which increases the probability of a given event as the cause of the service change based on instances stored in a historical database in which events of the same type as the given event occurred within a prior service change time window; and a historical weighting function which increases the probability of a given event as the cause of the service change based on instances in the historical database in which events of the same type as the given event were identified as having caused a prior service outage.

63. (Previously presented) The computer readable media comprising program code of claim 62 that, when executed by a programmable microprocessor, causes the

programmable microprocessor to execute a method for analyzing potential cause of a service change, wherein computing the probability distribution for the set of event comprises computing the probability distribution using a first weighting function which is the product of two or more second weighting functions.

64. (Cancelled)

65. (Previously presented) The computer readable media comprising program code of claim 62 that, when executed by a programmable microprocessor, causes the programmable microprocessor to execute a method for analyzing potential cause of a service change, the method comprising monitoring service quality, an wherein determining the service change time window comprises determining a service failure time window based upon a change in monitored service quality and narrowing the service failure time window to the service change time window based upon the service usage amount measured during the service failure time window.

66. (Previously presented) The computer readable media comprising program code of claim 62 that, when executed by a programmable microprocessor, causes the programmable microprocessor to execute a method for analyzing potential cause of a service change, the method comprising computing the probability distribution such that the total of all probabilities in the distribution is 1.

67. (Previously presented) The computer readable media comprising program code of

claim 62 that, when executed by a programmable microprocessor, causes the

programmable microprocessor to execute a method for analyzing potential cause of a

service change, wherein the service comprises service over a communication network

and wherein the detected events comprise network events.

68. (Previously presented) The computer readable media comprising program code of

claim 62 that, when executed by a programmable microprocessor, causes the

programmable microprocessor to execute a method for analyzing potential cause of a

service change, wherein the service comprises service provided by an application

program and wherein the detected events comprise application program events.

69. (Previously presented) The computer readable media comprising program code of

claim 62 that, when executed by a programmable microprocessor, causes the

programmable microprocessor to execute a method for analyzing potential cause of a

service change, wherein the service change is a service outage, comprising determining

the service change time window as a change in service from the first working state to

the second, non-working state.

70. - 77. (Cancelled)

Allowable Subject Matter

2. The following is an examiner's statement of reasons for allowance: see Office Action dated 30 May 2007.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SHANNON S. SALIARD whose telephone number is (571)272-5587. The examiner can normally be reached on Monday - Friday, 8:00 am - 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John W. Hayes can be reached on 571-272-6708. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

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Shannon S Saliard

Examiner

Art Unit 3628

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Examiner, Art Unit 3628

/John W Hayes/

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